



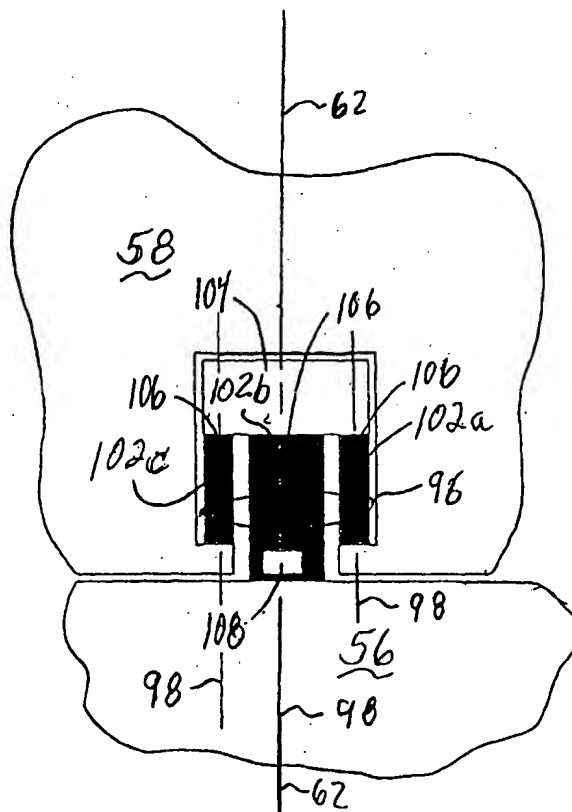
## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

<b>(51) International Patent Classification <sup>7</sup> :</b>  <b>G02B 26/08, G01P 15/08, G01C 19/00</b>	<b>A3</b>	<b>(11) International Publication Number:</b> <b>WO 00/13210</b>  <b>(43) International Publication Date:</b> 9 March 2000 (09.03.00)
<b>(21) International Application Number:</b> PCT/US99/20218 <b>(22) International Filing Date:</b> 2 September 1999 (02.09.99)  <b>(30) Priority Data:</b> 60/098,881                      2 September 1998 (02.09.98)      US 60/144,953                      21 July 1999 (21.07.99)              US  <b>(71) Applicant:</b> XROS, INC. [US/US]; 750 N. Pastoria Avenue, Sunnyvale, CA 94086-3522 (US).  <b>(72) Inventors:</b> SLATER, Timothy, G.; 1032 Irving Street, San Francisco, CA 94122 (US). NEUKERMANS, Armand, P.; 3510 Arbutus Avenue, Palo Alto, CA 94303 (US).  <b>(74) Agent:</b> SCHREIBER, Donald. E.; P.O. Box 64150, Sunnyvale, CA 94088-4150 (US).	<b>(81) Designated States:</b> CA, JP, KR, European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).  <b>Published</b> <i>With international search report.</i>  <b>(88) Date of publication of the international search report:</b> 15 June 2000 (15.06.00)	

**(54) Title:** MICROMACHINED MEMBERS COUPLED FOR RELATIVE ROTATION BY TORSIONAL FLEXURE HINGES

**(57) Abstract**

A monolithically fabricated micromachined structure couples a reference frame (56) to a dynamic plate (58). Performance of torsional oscillators or scanners benefits greatly by coupling the frame (56) to the plate (58) with folded torsional flexure hinges (96) rather than torsion bars. A folded torsion flexure hinge (96) for supporting the plate (58) from the frame (56) is made up of three basic hinge segments (102a, 102b, 102c). Each basic hinge segment (102a, 102b, 102c) has a longitudinal axis (98) which is not oriented perpendicular to the rotation axis (62) of the plate (58). An intermediate region (104) of the folded torsional flexure hinge (96) couples together immediately adjacent ends (106) of the basic hinge segments (102a, 102b, 102c). A basic hinge segment (102b) may include a torsion sensor (108) for measuring angular rotation of the plate (58) about axis (62) with respect to the frame (56).



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## INTERNATIONAL SEARCH REPORT

International application No.

PCT/US99-20218

**A. CLASSIFICATION OF SUBJECT MATTER**

IPC(7) :G02B 26/08; G01P 15/08; G01C 19/00

US CL :250/216; 73/504.2, 504.12, 504.12, 504.14, 514.01, 514.38

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

U.S. : Please See Extra Sheet.

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A, P	US 5,905,201 A (PETRI) 18 MAY 1999 (18/05/99), see entire document.	1-81
A	US 5,760,305 A (GREIFF) 02 JUNE 1998 (02/06/98), see entire document.	1-81
A	US 5,650,568 A (GREIFF ET AL) 22 JULY 1997 (22/07/97), see entire document.	1-81
A	US 5,635,739 A (GREIFF ET AL) 03 JUNE 1997 (03/06/97), see entire document.	1-81

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Date of the actual completion of the international search  31 MARCH 2000	Date of mailing of the international search report  14 APR 2000
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International application No.  
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## B. FIELDS SEARCHED

Minimum documentation searched

Classification System: U.S.

250/216; 73/504.2, 504.12, 504.12, 504.14, 514.01, 514.38; 250/234, 235, 236, 231.1, 231.13; 73 504.3, 504.4, 504.15,  
514.02, 514.16, 514.26, 514.29